



Space News Roundup

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No. 12

Roundup changes to embrace contractors, community

JSC's Space News Roundup will take the next step in its evolution April 11 when it returns to an every-other-week delivery schedule and broadens its focus to include more employee, contractor and community news.

The Roundup will take a one-week hiatus, with no paper being printed April 4, then return April 11 as an eight-page publication sporting a "new" nameplate. The new banner actually is the original, first chosen by an employee contest and published in 1961.

"Improved teamwork is essential if we are to accomplish our goals efficiently and effectively," said JSC Director George Abbey. "By

adjusting the focus of the center's official newspaper, we can encourage a stronger spirit of community among all of our employees—civil servants and contractors alike—and we can extend that spirit to our neighbors in the greater Houston area."

Public Affairs Director Doug Ward said the change also recognizes significant technical developments in the area of electronic communication.

"When we increased the publication frequency in 1988, the Roundup was one of the primary vehicles for communicating program and project news to our employees," Ward said. "With the advent of phone mail distribu-

tion lists, electronic mail and the Internet, it is much easier to spread the word about breaking news than it was 10 years ago. The changes we are making should allow us to provide added depth in the coverage of activities at JSC and to focus on the individual and group accomplishments that provide the foundation for program success."

Ward said he will be forming a JSC editorial board to advise him on Roundup content and to assist in formulating editorial policy. Ward initially will include representatives of Human Resources, Mission Operations, Engineering, Shuttle and Station Programs and Center Operations. Other organizations

will be asked to fill rotating assignments.

The Public Affairs Office will continue to keep employees up-to-date on breaking space program news by way of the Daily Cyber Space Roundup, which is offered online via the Internet, Ward said.

The Roundup staff will be on the lookout for inputs from a variety of sources to fill the eight-page paper, said Editor Kelly Humphries. In particular, the paper's staff will be in constant contact with newspaper staffs at the center's prime contractors so that it may share information about their activities with the center.

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JSC Photo 97-03461 by Mark Sowa

Four volunteers greet family, friends and dignitaries after spending 60 days in an air-tight chamber, breathing recycled air and drinking recycled water. The Phase IIA-International Space Station Life Support Test crew emerged last Friday from the chamber in Bldg. 7 after breaking a 25-year-old record set in support of America's first space station. The new mark surpasses the old record of 56 days held by Skylab astronauts in 1972. From left are, Team Lead Terry Tri, Facilities Project Engineer Dave Staat, Systems Engineer Fred Smith and Project Engineer Karen Meyers. Applauding them at far right is JSC Director George Abbey.

Chamber crew breaks 25-year duration record

By Karen Schmidt

Four volunteers emerged last Friday from an air-tight chamber in Bldg. 7 after breaking a 25-year-old record set in support of America's first space station.

Team Lead Terry Tri, Project Engineer Karen Meyers, Systems Engineer Fred Smith and Facilities Project Engineer Dave Staat unlocked the sealed chamber at 10 a.m. Feb. 14 and were greeted by family, friends and dignitaries—plus the astronauts who held the previous record.

"I feel like we are all going in the right direction and it was fantastic to be part of it all," Tri said. "I want to thank all the extended folks out there that made this happen. It wasn't just us by any stretch of the imagination, it was a huge effort by scores of people."

The new chamber record of 60 days surpasses the old record of 56 days held by Skylab astronauts Bill Thornton, Karol Bobko and Bob Crippen. They entered the chamber July 26, 1972, to begin the Skylab Medical Experiments Altitude Test and were released September 20, 1972. None flew on Skylab, but all did fly on the shuttle. Thornton and Bobko were on hand to congratulate the new record holders.

"It's 25 years later but some things never change," Thornton said. "Getting a successful flight off starts right here. If space station and Mars flights are to be successful this is an

essential part of it."

The four volunteers spent 60 days in the air-tight chamber as part of the Phase IIA-International Space Station Life Support Test. The crew entered the three-story 20-foot diameter chamber on Jan. 13 and spent their time investigating the use of mechanical and chemical means to recycle all air and water, including urine. These physicochemical air and water processors are of the same type that will be used on the International Space Station.

Each volunteer agreed that a team effort was essential in completing all the objectives of the test. If not for their fellow crew mates and support personnel, they said, the test would not have been such a success.

"This has been the most incredible experience of my life," Meyers said. "As the medical experiments coordinator, we successfully completed all of our demonstration projects during this test. It is important to obtain meaningful science in an environment like this, especially as we move toward assembly of the International Space Station and beyond."

Smith and Staat said the test should help keep the dream of returning to the Moon and Mars alive.

"It's been a ride and a great experience," Smith said. "Words Please see **CHAMBER**, Page 4



Anniversary marks milestone of American presence on Mir

Saturday marks the one-year anniversary of a continuous U.S. presence in space.

The year began with the launch of STS-76 to the Russian Mir Space Station leaving Astronaut Shannon Lucid and continues today with current resident Jerry Linenger.

Since Lucid arrived on Mir, astronauts John Blaha and Linenger have followed in her footsteps, conducting continuous scientific experiments aboard the Russian complex as a precursor to the development

and occupancy of the International Space Station.

Linenger will remain aboard Mir until mid-May, when he will be replaced by astronaut Mike Foale, who, in turn, will be replaced in September by astronaut Wendy Lawrence. The final U.S. astronaut scheduled for a tour of duty on the Mir is David Wolf in early 1998.

Former astronaut Norm Thagard was the first U.S. astronaut to live and work on Mir. Thagard spent four months on the Russian outpost in

1995. Lucid spent a U.S.-record 188 days in space from the time of her launch on March 22, 1996, to her return to Earth on STS-79 on Sept. 26, 1996. Blaha, who arrived on the STS-79 mission on Sept. 16 last year, spent 128 days in space, returning to Earth aboard *Atlantis* at the completion of STS-81 on Jan. 22. Linenger was launched on the STS-81 mission on Jan. 12.

As the anniversary passes, the Mir 23 crew stayed focused on sci- Please see **LININGER**, Page 4

NASA technology to help 'soak up' potentially dangerous chemical spills

By Audrey Schwartz

Almost as easily as a paper towel wipes away spilled milk, a layered, pillow-like absorbent pad developed at NASA's White Sands Test Facility may absorb and neutralize toxic and non-toxic chemical spills.

Under a Space Act Agreement signed last week between JSC and New Mexico Highlands University, the university will improve the pad's versatility to contain, neutralize and clean up a variety of potentially dangerous chemical spills. The pad initially was designed to absorb any hydrazine spilled from spacecraft

engines during the space shuttle tanking process.

The pad's absorbent interior containing chemically reactive agents counteracts the dangerous chemicals within the spill. The chemical reagents are selected to neutralize specific toxic, acidic or caustic spills. Once the chemical is neutralized, the pad is ready for disposal. Assembled in a "cut-and-sew" process, the pads can be easily made to whatever size a clean-up job requires.

Through the Space Act Agreement, New Mexico Highland Uni-

versity will incorporate enhancements to increase absorption speed, improve reliability and improve toxic reactive agent effectiveness. In addition, the university will identify research needed to make the pads safe in environmental protection applications as well as develop a testing plan for the prototype.

JSC will provide limited engineering data, technical facilities for testing and technology transfer assistance. The resulting technology will be used by NASA programs and others where containment of hazardous liquids is necessary.



JSC Photo by Robert Markowitz

Kent Hargett, who along with Mike Markin makes up the Irish group Godfrey's Rangers, entertains the lunch crowd with his penny-whistle in the Bldg. 3 cafeteria as part of the St. Patrick's Day celebrations at JSC.

Volunteer help needed for exhibit

Baybrook Mall is sponsoring a NASA/JSC/Moody Gardens Exhibit during April and May and volunteers are needed to staff the exhibit.

The Space Station module mock-up will require staffing April 12-23. Mall hours are 10 a.m.-9 p.m. Monday-Saturday, and noon-6 p.m. Sundays. Employees may volunteer for one six-hour shift or more. This time will count toward the employee's 40-hour work week.

A training session will be available Friday, April 11 at Baybrook Mall to give employees the opportunity to make this project interesting, informative and enjoyable. To volunteer, contact Jean Womack, at x34618.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Bay Area Chorus: Spring Scholarship Concert at 4 p.m. April 27 at Clear Lake United Methodist Church. Tickets are \$10 for adults, \$5 for students and seniors.

Disney on Ice: "Toy Story" noon April 5 at the Summit. Tickets are \$12.

JSC Picnic: 11 a.m.-8 p.m. April 6 at Astroworld. Tickets are \$15 for the first 3,100.

EAA cruises: Seven-day cruise to Alaska for \$1,294 per person May 23-31. Seven-day cruise to Caribbean leaving from Houston in November. Prices vary depending on cabin choices. For more information call Dick McMinimy at x34037.

Astroworld season pass: \$56.75, early bird tickets are \$18.25.

Moody Gardens: Tickets are \$9.50 for 2 of 3 events.

Space Center Houston: Adult \$8.95; children (4-11) \$6.40.

Seaworld: Adult \$27.25; \$18.25 children (3-11).

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75.

JSC logo shirts: Polo style, \$23. T-shirt, \$10.

Stamps: Book of 20, \$6.40.

Orbit: The book "Orbit" by Jay Apt, Mike Helfert and Justin Wilkinson is on sale for \$28.

Metro tickets: Passes, books and single tickets available.

JSC

Gilruth Center News

New Hours: The Gilruth Center will now remain open until 2 p.m. Saturday and close at 9 p.m. Friday. **Sign up policy:** All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a yellow EAA badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

EAA badges: Required for use of the Gilruth Center. Employees, spouses eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 9 a.m.-1 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

NASA Fitness Challenge: runs through Aug. 31. Call x30301 for more information.

Complete Weight Control Program: starts April 1 with sessions on Monday, Wednesday and Friday. For more information call x30301 or x30302.

Hatha Yoga: A stress relieving, stretching and breathing exercise routine to unite body, mind and spirit. Classes meet from 5:30-6:30 p.m. Thursdays. Cost is \$40 for eight weeks.

Nutrition intervention program: A six-week program to learn more about the role diet and nutrition play in health, including lectures, private consultations with a dietitian and blood analysis. Program is open to all employees, contractors and spouses. For more information call Tammie Shaw at x32980.

Defensive driving: One-day course is offered once a month. Pre-registration required. Next class is March 22. Cost is \$25.

Stamp club: Meets at 7 p.m. every second and fourth Monday in Rm. 216.

Weight safety: Required course for employees wishing to use the weight room will be offered from 8-9:30 p.m. March 25. Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for six weeks.

Aikido: Martial arts class meets from 5:15-6:15 p.m. Tuesday and Wednesday. Cost is \$35 per month. New classes begin the first of each month.

Aerobics: Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Ballroom dancing: Beginner classes meet from 7-8:15 p.m. Thursdays. Intermediate and advanced classes meet from 8:15-9:30 p.m. Cost is \$60 per couple.

Country and Western dancing: Beginner class meets 7-8:30 p.m. Monday. Advance class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

Fitness program: Health Related Fitness Program includes a medical screening examination and a 12-week individually prescribed exercise program. For more information call Larry Wier at x30301.

Gilruth Home Page: Check out all activities at the Gilruth online at: <http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

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Property

Sale/Rent: Boat slip on Clear Lake w/roof and motorized boat hoist for power boats, \$7.3k or \$125/mo. 474-4922.

Rent: Lake Travis cabin, private boat dock, CA/H, fully equipped, accommodates 8, \$550 spring/\$650 summer/week, \$120/day. 474-4922.

Sale: Large wooded lot 90' x 135' in Taylor Lake Estates waterfront subdivision near JSC, \$39.5k cash finance. Don, x38039 or 333-1751.

Sale: Angel Fire, NM, 1 acre lot, almost at top of mountain, view of town and golf course, walk or ski to ski run, elec and water, golf and ski free, \$10k, will consider trade for saltwater boat. J. B. Williamson, 409-933-0692.

Sale: Pointe San Luis West Beach lot #38, Blk 1, near best Galveston fishing grounds, utilities, paved streets, \$19,950. x34006 or 281-554-6200.

Rent: University Green 2-2-2 one-floor townhouse, very clean, nice backyard and deck. 335-5652.

Lease: Fuqua Exit 3-1.5-2 attached, remodeled throughout, gourmet kitchen, whirlpool bath, fenced, trees, \$750/mo plus equal deposit. Bryan, x41141 or 337-5475.

Rent: Webster large 2-2 condo, W/D, covered parking, no pets, \$575/mo plus \$500 deposit. 483-1971.

Sale: Diskinson upscale neighborhood, 3-2-2, enclosed patio, FPL, dining room, breakfast room, \$122k. 337-2015.

Rent: University Green townhouse, 2-2.5-1, W/D incl, no smokers, pets acceptable, \$700/mo plus \$500 deposit. x31213.

Lease: Baywind 1 BR condo, pool and party room privileges, no pets, will consider sale, \$425/mo. 281-474-7158.

Rent: Egret Bay single BR condo, \$425/mo. Max, x38564 or 331-7957.

Sale: Galveston Isla Del Sol, 2 lots. 334-2317.

Sale: 40 prime/clear acres, house, barn, all amenities, 15 mi east of Tyler, \$120k. 488-5058.

Cars & Trucks

'93 Mazda XL626, \$8k. 480-3058.

'95 Pontiac Firebird Formula, 350 V8, 6 spd manual transmission, red/gray, loaded, 19k mi, \$16.9k. Steve, 480-6415.

'96 Chevy Silverado Z71, Sportside, red w/gray cloth int, loaded, 5 spd, warranty available, 15.5k mi, \$19.8k. Phil, 244-4216 or 332-2150.

'85 Honda Prelude, ex running cond, high mileage but maintained regularly, 1.8L, PS, PB, moon roof, new tires, clutch, CV joints and bearings replaced. 334-6304.

'95 Ford Aspire, 2 dr, 4 cyl, 5 spd, 13k mi, good economy car, \$5.3k. Oscar, x45170 or 281-996-9353.

'88 Mustang LX, 2.3L, 89k mi, ex cond, manual transmission, new stereo, cust wheels, \$2.5k obo. Bryan, x36911 or 575-6310.

'93 Ford F250 Diesel turbo 4 wheel dr, xlt, '93 Bigfoot camper, air loaded, ex cond, low mi, sell one or both, or take over payments. Anthony, 281-461-9522.

'94 Ford F250 XLT, 7.3 Diesel, trailer tow pkg, auto, ext cab, 4.10 axle, sprayed bedliner, \$16.5k. David Pitts, 488-3276.

'93 Ford Ranger XLT, 5 spd, Oxford white, ex

cond, AC, AM/FM/cass, rear sliding window, 80k mi, \$5k. x37936 or 409-925-424.

'91 Honda Accord DX, 5 spd, AC, stereo, new tires, 95k mi, ex cond, \$6.5k. Joe, x38851 or 488-1750.

'91 Plymouth Grand Voyager Le, loaded, CD, alarm, pwr seats, non smoker, priced at loan value. Larry, x31795 or 481-9058.

'91 Eagle Talon, black, 60k mi, pwr doors, windows, mirrors, cruise control, sunroof, new tires, \$6.5k obo. 281-282-0387.

'93 Corvette Coupe. 15k mi, 300 hp, 2 tops, theft deterrent sys, AC, cruise, all pwr, traction control, premium stereo, chrome wheels, climate control, fabric cover, garaged. \$23k. x34725 or 326-4968.

'88 Chevy pickup, one owner, ex cond, 70k mi, \$7k. 480-4432.

'55 Chevy Stepside PU, 400SB w/headers and flowmaster, 400TH w/2400 stall, Camero subframe and rear end, front disc brakes, PS w/tilt column, AC connected but needs charge, Micky Thompson tires w/superlite wheels, orange paint w/all chrome redipped, 99% restored. Victor, 286-0266.

'90 Nissan 300ZX, gold, low mi, ex cond, \$12.5k obo. x30742 or 286-3318.

'92 BMW 325i, diplomatic 4dr sedan, auto, 6 cyl, granite silver, 189 hp, limited slip differential, sunroof, leather, 57.1k mi, ex cond, \$18.9k obo. Derek, 281-480-6578.

'81 Chevrolet Silverado, good cond, AC, auto, \$3k obo. James, 281-5583.

'93 Chevy Camaro Z-28, black, 6 spd, \$13k. '91 Toyota truck, white, 4 cyl, 5 spd, \$5.6k. 281-334-2118.

'79 Toyota Corolla, 2dr, 5spd, good tires, \$800. Steve, x37626.

'85 Pontiac Trans Am, performance suspension, performance sound, AC, V8 tuned port fuel injection, clean, \$3.2k obo. 286-0453.

'88 Camaro, 5.0L V8, 4 spd auto trans w/overdrive, PW, PL, cruise control, alarm, low mi, runs great, clean interior, \$4,850. 992-3653.

'89 Mazda 626 LX, PW, PL, AC, AM/FM/cass, cruise control, alloy wheels, sunroof, one owner, well maintained, 4.5k mi. Vanessa, x37343 or 713-748-8739.

'90 Mazda Miata, red convertible w/hard top, 5 spd, AC, AM/FM/cass, pwr windows, \$8.2k. Karen, x38784 or 326-5385.

Boats & Planes

'73 Lavey Craft, V drive, bbc, LS7, tunnel ram, Holley, Accel ignition, 2 spd Power Glide, castle, extra prop, custom trailer, interior and cover, \$7.5 obo. 486-6500.

'16' Hobie Cat, dk blue sails w/red star, trailer, \$900 obo, will trade for pop up camper. 244-6207 or 339-0752.

Two stand-up jet skis, 750 SX w/custom engine, 100 hp, and 550 SX w/minor modifications, well maintained, garaged, custom trailer, \$5.5k. 281-282-0669.

Half ownership in 28' Pearson sailboat, 3 sails, spinnaker, 30 hp, inboard atomic 4 eng, \$5K + \$100/mo maint/slip fee. x47806 or 538-1681.

'93 Crownline 20 family ski-fish seats 8, Mercruiser 305 V8, SST prop, depthfinder, AM/FM/cass, low hours, bimini top, custom cov, Shorelander custom trailer, \$13.9k obo. Don, x38039 or

JSC

Dates & Data

Today

ISO meeting: The ISO 9001 Office will conduct a "Town Hall Meeting" at 3 p.m. March 21 in Bldg. 30 Auditorium. Lee Norbraten, director of the ISO 9001 Office, will answer questions about the implementation of ISO 9001 at JSC. For details call Leon Blum at X33681.

Book signing: Authors Kevin Anderson and Doug Beason sign their new book "Ignition," from 6:30-8:30 p.m. March 21 at Jeremy's Bookshelf, 2441 Bay Area Blvd. For details call Jeremy's at 486-8028.

Cafeteria menu: Special: fried chicken. Total Health: vegetable lasagna. Entrees: pollock hollandaise, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots, zucchini, breaded okra.

Monday

Reservations due: The American Institute of Aeronautics and Astronautics will meet at 5 p.m. March 27 at Ellington Field, Hanger 594. Ramesh Agarwal will discuss "General Aviation, Past Present and Future." Barbeque dinner cost \$3 for members and \$6 for non-members. Reservations are due at noon March 24. For reservations and more information call Danita Thomas at x32348 or Pam Sisk at x38341.

Cafeteria menu: Special: meat sauce and spaghetti. Total Health: potato baked chicken breast. Entrees: wieners and beans, sweet and sour pork chop, potato baked chicken, steamed fish, French dip sandwich. Soup: cream of broccoli. Vegetables: green beans, seasoned rice, vegetables, buttered beans.

Tuesday

Cafeteria menu: Special: smothered steak with dressing. Total Health: baked potato. Entrees: beef stew, liver and onions, shrimp

Creole, baked chicken, fried cod fish, French dip sandwich. Soup: navy bean. Vegetables: steamed rice, seasoned cabbage, corn O'Brien, peas.

Wednesday

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. March 26 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich at x45752.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. March 26 at United Space Alliance, 600 Gemini. For details call Pat Blackwell at 282-4302 or Ben Black at 282-4166.

Astronomy seminar: The JSC Astronomy Seminar will be held at noon March 26 in Bldg. 31 Rm. 129. An open discussion meeting is planned. For more information call Al Jackson at x35037.

Cafeteria menu: Special: salmon croquette. Total Health: baked potato. Entrees: roast pork, stir frybaked perch, steamed fish, vegetable lasagna, Reuben sandwich. Soup: seafood gumbo. Vegetables: mustard greens, okra and tomatoes, vegetable sticks, lima beans.

Thursday

Radio club meets: The JSC Amateur Radio Club will meet at 7 p.m. March 27 at Piccadilly Cafeteria, 2465 Bay Area Blvd. For details call Larry Dietrich at 39198.

PMA meets: The Performance Management Association will meet at 11:15 a.m. March 27 at the Ramada King's Inn on NASA Road 1. The featured topic is "Preparation for PMS Compliance Reviews: A Government and Contractor Perspective." Lunch costs \$12, with advanced reservations. For details call Greg Smith at x36088.

Cafeteria menu: Special: stuffed cabbage rolls. Total Health: baked potato. Entrees: beef tacos, ham and lima beans, pork and beef egg rolls, steamed fish, catfish, French dip sandwich. Soup: beef and barley. Vegetables: Brussels sprouts, green beans, squash, pinto beans.

Friday

Cafeteria menu: Special: baked chicken. Total Health: roast beef au jus. Entrees: deviled crab, baked chicken, beef cannelloni, steamed pollock, Reuben sandwich. Soup: seafood gumbo. Vegetables: carrots, peas, breaded okra, cauliflower.

March 31

Crew briefing: A four-person team will talk about its experience living in a special air-tight chamber at JSC for 60 days at 3:30 p.m. March 31 in Teague Auditorium. Terry Tri, Karen Meyers, Fred Smith and Dave Staat will discuss the Phase IIA-International Space Station Life Support Test. For details call Helen Harris at x38413.

April 1

ASQC meets: The Bay Area Section of the American Society for Quality Control will meet at 6 p.m. April 1 at the Ramada King's Inn on NASA Road 1, Lee Norbraten, director of the ISO 9001 Office, will discuss JSC's ISO 9001 certification effort at JSC. Dinner cost \$9 and advance reservations are not required. For more information call Ray Swindle at 335-6948.

April 15

Open house: The Information Systems Directorate will host an open house of the Scientific and Technical Information Center from 10 a.m.-3 p.m. April 15 at Bldg. 45 annex. For more information call the STIC at x34240.

Swap Shop

Lost & Found

Lost: lady's keepsake gem-studded gold tiger pin. Pin was lost at Rotary National Space Award banquet. Max Faget, 538-6060 or 337-3961.

Lost: watch w/brown leather band. 996-9744.

Cycles

Ladies' Raleigh 3 spd bicycle w/bicycle pump, ex cond, \$150. 333-2335.

Spectrum Landsailor, go-cart w/sail, ex cond, \$400. Arlene, x37150.

Bike rack, mounts on space tire, like new, \$45. x31385.

Kawasaki motorcycle, 550 LTD, \$1k. 286-5816.

Audiovisual & Computers

Pioneer KEH-M7500 car radio/cass deck, detachable face, CD changer controls, many features, \$100. Lisa, x40213 or 992-7302.

486DX2/66, 16Mb RAM, 15" monitor, 14.4 fax/modem, 2Gb HD space, 16 bit sound card/speakers, 2X CDROM, 3.5" FD, Windows 95, misc S/W. \$700 obo. 281-286-2604.

King Wiper II satellite tracker, receiver, 3 clickers, \$275; pair Electro Voice 15" integrated 3-way loudspeakers, \$200. 281-481-5709.

Apelco 4500 VHF radio, used only twice, \$50. x48579.

TRS-80, external floppy drive, some software, free, x31265.

Yamaha DX27 digital synthesizer, \$400; Yamaha Portatone PSR80 keyboard, \$80; Crate KX-15 amp, \$100. Phil, 244-4216 or 332-2150.

Pets & Livestock

Lovebirds, young adults and chicks ready in 6 wks, \$20; hand tamed, \$40; call now for hand trained chicks. Robin, x47471 or 331-4030.

Free to a good home, 3/4 yellow Lab, 1.5 yr old, female. 338-2090.

One year old male black schipperke mix, very social, loves kids, neutered, up to date shots, \$60. 489-4549.

Six mo old puppy, female, spayed, all shots, terrier mix, house trained, good w/people and other dogs. x30229 or 326-5180.

Free to good home, lg fem dog, spayed, solid white 4 yr old, white shepard/golden Lab mix, Dogloo incl, needs lg yard. x32572 or 281-992-2544.

Musical Instruments

'86 Epiphone guitar by Gibson, Sheraton ASB hard case, Peavy special amp, \$550 firm. x36174 or Wade West, 281-593-0857.

Classical guitar by Pimentel of Albuquerque, NM, ex cond, signed and dated, \$400. 713-666-4824.

Milton upright piano, good cond, \$500. 282-3381 or 488-8466.

Trombone. 996-9744.

Crate cabinet, 4 12" speakers, \$250; Marshall 8100 Valvestate 100W head, 2 channels, effects, loop, reverb, channel/reverb footswitch and manual incl, like new, \$350, Angela, 281-332-7009.

Photographic

Nikkormat FT2, Nikkor 35mm f2.8, 50mm f2.0, and 135mm f2.8 lenses, Nikkor TC1 SX teleconverter, several Hoya special effects filters, Nikon ever-ready leather camera case, all optics in mint condition, viewfinder shutter speed indication inoperative, \$500 for all. 479-3287.

Household

Black metal frame futon w/off white cushion, 4100. 283-5638.

On sz waterbed w/motionless mattress, mirror headboard, 6 drawer underdresser, \$350 obo. 482-5780.

On sz sofa/sleeper, \$100; 2 Lane rocker/recliners, \$50 ea; Little Tykes covered slide, \$30. 282-3381 or 488-8466.

Livingroom chair, golden harvest color, swivels and rocks, \$30 obo; papasan chair, orange color, \$20. Lisa, x40213 or 992-7302.

Frigidaire custom deluxe electric range-top, almond color, good cond. 482-5837.

Refrigerator, 18.6 cu ft, w/ice, almond, \$300; portable B&W TV, \$40; BEL radar detector, \$40. Kelly, x36818.

Side-by-side refrigerator, 23.7 cu ft, ice and water dispenser in door, 6 yrs old, white, \$550; GE washer and dryer, set 4.5 yrs old, \$350; blue leather chair, \$275. 486-6009.

Full size stereo cabinet, wood w/glass doors, \$25; AIWA bookshelf CD stereo, \$100. Steve, 480-6415.

Round oak pedestal dining table w/4 oak chairs, \$450; small electric dryer, \$50; JenAir electric built-in convection oven, \$50; free standing gas range, electric ignition, \$200; Bryan, x41141 or 337-5475.

Wood and glass coffee table, 57" x 25", like new, \$125; Lazy-Boy recliner, sand color, \$100. Mark, x30131 or 488-0056.

White kitchen table w/4 chairs, 42" round, ex cond, photo available on site. Ron, x48200.

Kg sz waterbed, 8 drawers, 3 cabinets, mirrored headboard w/2 cabinets, good cond, \$50. 338-2090.

Hoover canister vacuum cleaner, 2.2hp w/attachments, \$22 obo; 3.5hp gas mower, mulcher w/bag, ex cond, \$65; Rainbow vacuum cleaner w/pwr nozzle and attachments, ex cond, \$325; full sz mattress, box spring, metal frame, \$75. 286-5816.

Toaster, carpet sweeper, various sz tupperware. 480-3424.

Ethan Allen entertainment center, \$600; Bassett living room

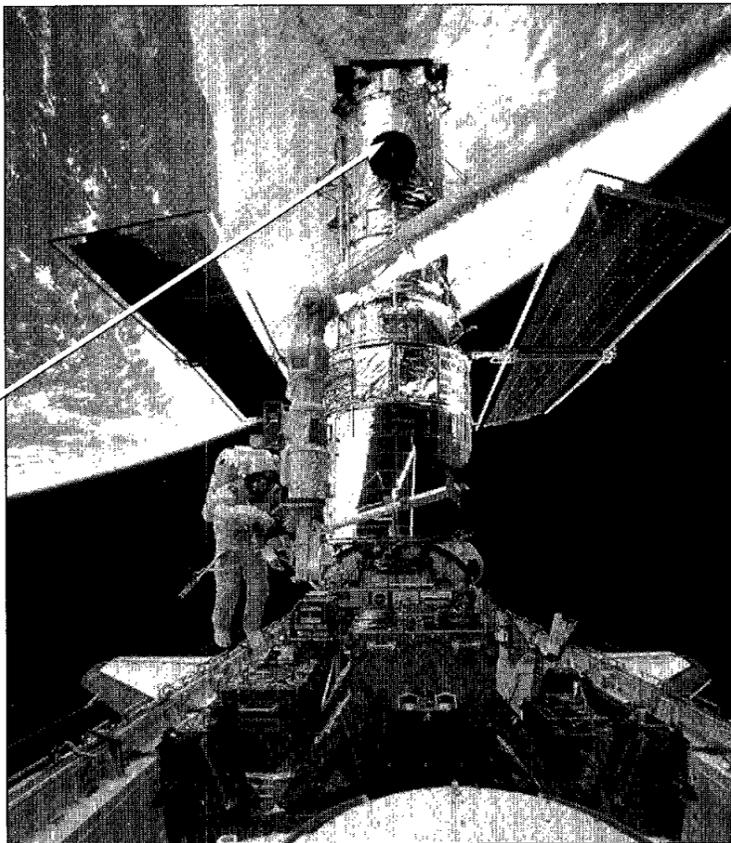
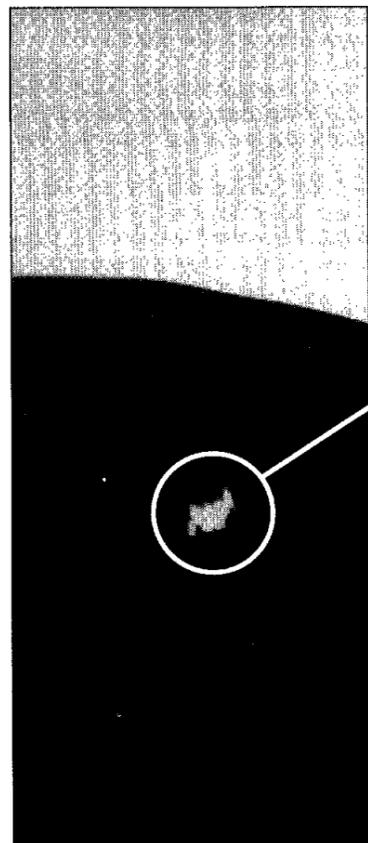
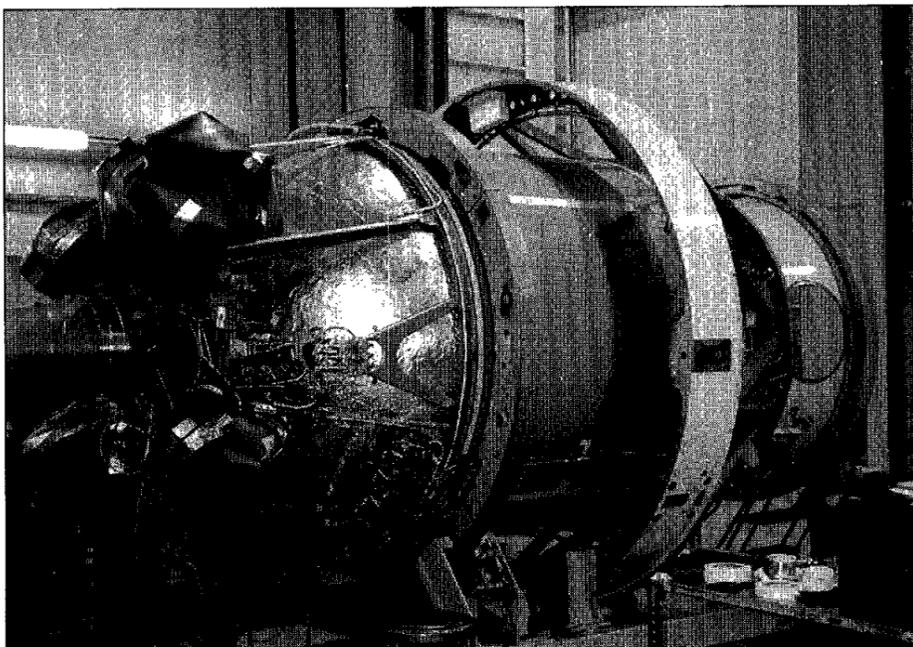
Success Story

JSC scientists influence international change to protect low Earth orbit



Top: From left, Mike Brennan and Julie Roberts-Pate of Center Operations' Support Operations Division examine the 600-pound Delta propellant tank and an attached sphere that was recently delivered to JSC. The tank and sphere returned to Earth in two different farmers' fields in Texas. The major piece left of the rocket was the stainless steel shell. Right: A Delta propellant tank before launch and reentry.

JSC Photo 97-03302 by Steve Candler, Delta tank photo by Nick Johnson



Top: Before servicing the Hubble Space Telescope, scientists had no idea there was a small tear in the telescope's high gain antenna caused by orbital debris. Despite the damage, the antenna continues to function normally. Right: Astronauts onboard *Discovery* during STS-70 capture evidence that orbital debris can be hazardous to the space shuttle. While orbital debris continues to increase NASA in conjunction with other nations is working to reduce the risk to space travelers. In addition NASA, the Department of Defense and the department of Transportation will present to industry the NASA safety standard for debris management for all NASA spacecraft, which DOD is assessing for its activities and NASA is proposing to be the initial basis for a standard U.S. practice.

NASA Photos STS061-66-016, STS082-310-017 and STS070-309-026

Since the early 1980s JSC scientists have devoted their skills to learning about orbital debris and how to protect space travelers. Their efforts are paying off.

JSC scientists—in cooperation with their colleagues around the world—have made great strides in helping curb the growth of debris that circles the Earth. Today there are about 4.6 million pounds of debris in low Earth orbit.

"The situation in terms of the environment is such that it is worse than it was in 1988, but we have made very significant progress in efforts to manage the environment for the future," said Joe Loftus, assistant director for Engineering, Space and Life Sciences Directorate. "Every launching nation has made modifications to the design and operation of its upper stages simply because they recognize that it is in their best interests to do so.

"I think that in terms of environmental management, this is a success story. There will always be a debris threat, but I think the efforts we are engaged in are such that we can probably keep the environment from getting worse than it is. In terms of risks in space operations, this is well into the same range of risks as the other risks we face," Loftus said.

Orbital debris has become an important concern for space travelers, since even a tiny paint flake can cause damage because of its orbiting velocity.

"Orbital debris is anything in Earth orbit that is not a functional spacecraft or an object that cannot perform a useful purpose," said Nick Johnson, JSC's senior scientist on orbital debris.

More than 9,500 large objects are currently being tracked by the Space Surveillance Network at the U.S. Space Command in Colorado Springs. In 39 years of space travel, more than 24,000 pieces of orbital debris have been cataloged. The JSC orbital debris team has conducted experiments during missions to fine-tune equipment, so that measurements and tracking are accurate.

"The issue in low-Earth orbit is the very high velocities and therefore the very large energy exchange when there is an impact," Loftus said. "The spatial density (number of objects per cubic mile) of things in low-Earth orbit is the highest of anywhere in space."

With so much debris, the team is an integral part of missions and International Space Station design teams.

During STS-82, the team worked closely with the Space Surveillance Network and Mission Operations to evaluate special debris hazards. Precise calculations can be made only

24 hours in advance due to the dynamics of debris. Flight Director Brian Austin elected to maneuver *Discovery* away from a possible collision with a piece of a Pegasus upper stage that exploded in orbit.

"The orbital debris threat is different in different directions because of the conjunction of orbits between the debris and the shuttle," Johnson said. "Some portions of the orbiter are more vulnerable than others. So we like to fly upside down with the engines into the direction we are flying. Before the flight, we run models of the entire mission profile to know exactly where the shuttle is pointed during the mission. We protect the shuttle from the big things by simply doing avoidance maneuvers."

Moving from shuttle missions to docking with the Mir Space Station, and building the International Space Station have challenged the team to develop better protection methods.

"When we laid down the shuttle design in the early 70s, we designed to the meteoroid environment as we had for all of our previous spacecraft," Loftus said. "We have lived with the orbital debris environment by controlling the attitude timeline of the missions. When we get into the assembly of the station as in the case of the Mir missions we can no longer control this threat in that manner. So a team has been working to make the orbiter more robust for these missions."

Johnson said the team expects to learn much more about orbital debris as it inspects the largest known piece of space debris to reenter the atmosphere and land on Earth. The debris was recently delivered to JSC.

The 600-pound Delta propellant tank and an attached sphere returned to Earth in two different farmers' fields in Texas. The major piece left of the rocket was the stainless steel shell. Aluminum bands around the rocket and the engines had melted during reentry, but the rivets and bolts that held them in place were intact. The 67-pound titanium sphere was detached from the rocket but otherwise intact.

The debris was returned to JSC because scientists here are considered the international experts in orbital debris and hypervelocity impact, having continually studied the subject.

"In the past the DOD has questioned the significance of the orbital debris hazard," Johnson said. "But, recently most of the DOD is coming to believing that what we say is in accurate."

Orbital debris is not just a concern for NASA. In conjunction with other nations, NASA is a leader in the working group helping to reduce the amount of orbital debris in space.

"We have what's called the Interagency Space Debris Coordination Working Group and every launching nation with the exception of Israel is a member," Loftus said. "We meet generally about twice a year. We coordinate observation campaigns, modeling studies, explosive tests, design and operations practices. Within the United States we have an interagency working group, predominantly NASA and DOD, but also Transportation, FCC, State and Commerce, and the intelligence community."

At an upcoming workshop, NASA, DOD and DOT will present to industry the NASA safety standard for debris management for all NASA spacecraft, which the DOD is assessing for its activities and NASA is proposing the initial basis for a standard U.S. practice.

"The purpose of the workshop is to get industry views as to what we are doing," said Loftus. "My sense is that they will respond positively because this is a very different environment than most environmental management problems. The problem with trying to control pollution in terrestrial settings is that we (here) may create atmospheric pollution, but the people who get the benefit of it are in Ohio. In space, everybody is downstream from themselves. Because everything moves, it's in everybody's best interest to minimize debris."

While the threat is still there, scientists are making progress to reduce and protect space travelers from orbital debris.

"This is a success story," Loftus said. "The people who are using this environment are accepting the costs of trying to protect it for future operations. And it's all been done on a voluntary basis. I think that's a unique thing in environmental history." □

Linenger completes host of science experiments

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ence work and took inventory of tools and equipment that will be used for a space walk in mid-April by Mir 23 Commander Vasily Tsibliev and Linenger.

During breaks from their science work, the crew is generating oxygen by burning solid fuel oxygen generators. Approximately 23 candles have been used to maintain acceptable oxygen levels.

With enough oxygen generators on board to last several months, the crew has been instructed to concentrate on its regular flight plan activities and await the arrival of the next Progress resupply vehicle April 8 before attempting additional repairs on the primary oxygen generating system. In addition to new Orlan spacesuits for Tsibliev's and Linenger's space walk, the April 6 Proton launch will carry repair equipment for the Elektron system and additional oxygen candles.

One of the Elektron systems requires a

replacement pump and the other may need a new custom-made filter. Russian flight controllers believe the pump is malfunctioning in one and that contaminants may have clogged the filter in the other unit. The Elektrons use the process of electrolysis to separate breathing oxygen out of the processed waste water.

The Progress resupply ship also will carry supplies of food, equipment and personal effects for the crew. Once docked, Progress 234 will be unloaded and the crew will practice a manual docking, at a range of up to 8,000 meters, using the remotely operated rendezvous system, called TORU for its Russian acronym. The TORU system is required for use at greater distances since this manual method for docking is being phased in by Russian controllers in lieu of the automatic docking system. Though the crew members

kept busy with science work on the station, they also commented on being able to see the Statue of Liberty in New York Harbor and the recently discovered Comet Hale-Bopp.

Linenger began the Human Life Sciences Humoral Immunity Investigation which assesses the body's immune system response to an antigen vaccination. The experiment involves taking seven blood samples during a one month period to study the immune cells in the human body. Samples are collected at timed intervals to measure antibody production and to determine the effectiveness, extent and time course of the antibody response.

The Microgravity Opposed Flame Flow Spread was begun to help determine the processes that affect flame propagation when materials are exposed to varying air flow speeds in microgravity. Both the

Microgravity Glovebox and the Space Acceleration Measurement System are activated to support this experiment.

An Enhanced Dynamics Load Sensor session was performed to measure the forces exerted by the crew members on the Mir structure during daily activities.

The Human Life Sciences Sleep Investigation, a study that examines alterations to the body's immune system with relation to sleep in microgravity, continued last week. The experiment is designed to provide long-term data on the physiology and behavior of human sleep under prolonged microgravity conditions. This sleep investigation experiment is scheduled periodically throughout Linenger's flight.

The 96-hour Liquid Metal Diffusion experiment sample was completed last Monday. LMD is designed to evaluate material dynamics and uses the Microgravity Isolation Mount to reduce or eliminate vibrations that could disturb the sample processing.



Managers eye Columbia launch status

The seven-member crew of STS-83 is less than three weeks away from a ride into space aboard Space Shuttle Columbia to conduct 16 days of science operations.

Launch is scheduled for 1:01 p.m. April 3 for the Microgravity Science Lab-1 mission, a collection of microgravity experiments housed in the Spacelab long module. MSL features 19 materials science investigations in four major facilities that will bridge the gap between Spacelab and International Space Station research.

Shuttle managers meeting in the Flight Readiness Review this week were expected to clear Columbia for launch pending resolution of questions regarding

dynatube seals in the right Orbital Maneuvering System pod. Concerns over the seals and how they were installed were raised earlier this week. A review of processing documentation and x-rays will be used to resolve the issue.

Commander Jim Halsell, Pilot Susan Still, Payload Comander Janice Voss, Mission Specialists Don Thomas and Michael Gerhardt and Payload Specialists Roger Crouch and Greg Binteris took part in the final dress rehearsal last week during the Terminal Countdown Demonstration Test at Launch Pad 39A. Thomas, hobbled by a broken ankle since January, has been granted doctor's permission to fly on STS-83. Astronaut Cady Coleman, enlisted and trained as Thomas' backup, has been removed from the training mix.

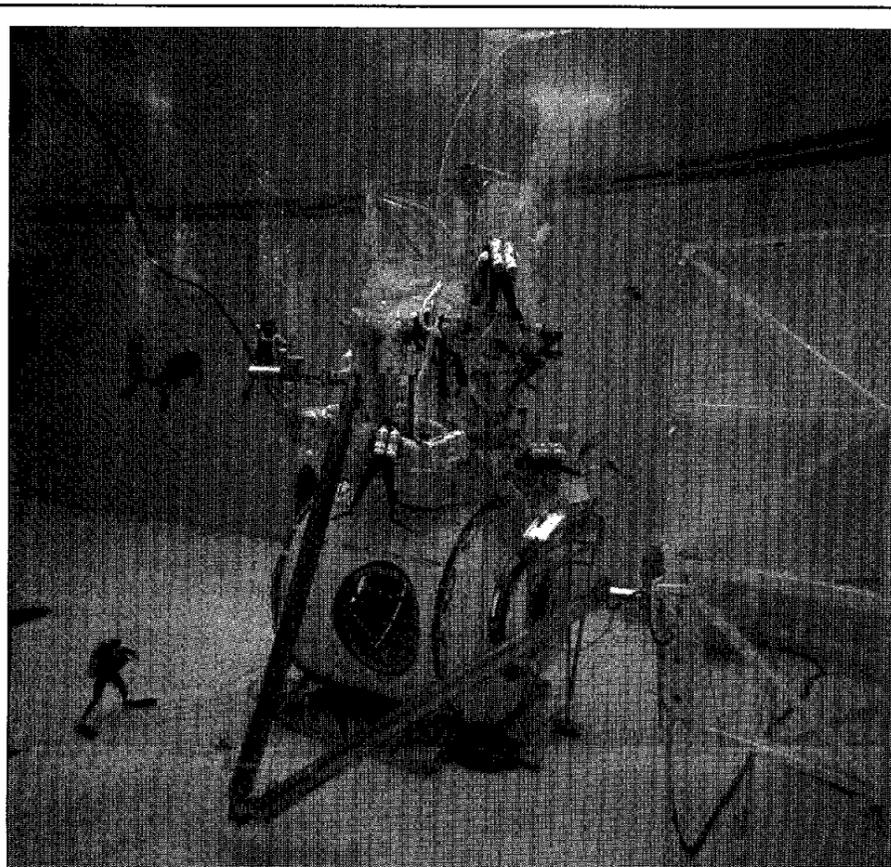
There is a two and a half hour launch window for STS-83. Landing is planned for April 19 at 7:37 a.m. at Kennedy Space Center.

In Palmdale, Calif., Endeavour is scheduled to roll out Monday following an extended period of servicing. Riding atop the Shuttle Carrier Aircraft, Endeavour is scheduled to fly into Ellington Field about 9 a.m. CST Thursday to refuel before returning to KSC. Public viewing will be offered from 10 a.m.-noon.

Health talk eyes osteoporosis

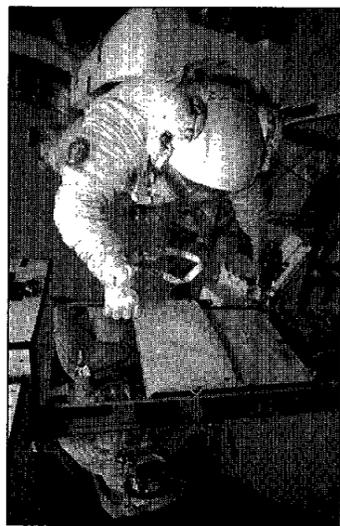
Osteoporosis will be the topic of a Total Health presentation at 11:30 a.m. today in the Bldg. 30 auditorium.

Dr. Linda Shackelford, an orthopedic surgeon and the technical lead for the Bone and Muscle Laboratory at JSC, will present "No Bones About It-Osteoporosis And You." All JSC civil service and contractor employees are invited. For more information, contact the JSC Clinic at x34111.



SPACE STATION TEST—Two more tests were completed this week to prepare astronauts and space builders for the real work ahead to build the International Space Station. Top: Divers prepare for astronaut verification tests in the new Neutral Buoyancy Laboratory at the Sonny Carter Training Facility. ISS Program Product Group 2 is conducting space walk simulations to verify designs and operations, and to test assembly and maintenance techniques for the Integrated Truss Segment (ITS) Z1 and ITS P6. These truss segments will be launch on assembly flights 3A and 4A. Right: Astronaut Chris Hadfield removes a thermal shroud covering a heat pipe radiator attached to ITS Z1 to verify its design for the flight 4A mission.

JSC photos 97-03377 and 97-03376 by Robert Markowitz



Chamber crew to talk to workers

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can hardly express my feelings right now but I just want to say thanks to everyone. The team is just awesome and management very supportive and it has all paid off. To me this just demonstrates our capability. We can do it and go back to the Moon and on to Mars."

"We have had a lot of support during the test and it goes beyond anything I can explain," Staat said. "This is the teamwork and spirit that got us to the Moon. It is the type of teamwork that is going to get us to Mars."

JSC Director George Abbey, Engineering Director Leonard Nicholson and Crew and Thermal Systems Division Chief Will Ellis were on hand to congratulate the team and encourage them to continue their research efforts.

"Congratulations for a job well done," Abbey said. "I don't think there is anybody here in Houston at this center that doesn't think a lot about what you guys have done. This is the start of something real significant and I hope we can continue it and keep it going. I think you got us off to a great start and we are very proud of all of you."

Before the hatch opening, family members

gathered outside the chamber to greet their relatives in a private ceremony. Mary Staat anxiously waited for grandson David to emerge from the chamber.

"This is really exciting," Staat said. "It might be a little overwhelming for them when they come out after being in there alone for three months."

Fred Smith's mother waited to see her son and looked toward the future.

"I think this test is very interesting. It is quite an experience for all of them," Lora Smith said. "Hopefully it will be something that they can use in the future for space travel."

During the test, team members provided daily status reports on the operation of the air revitalization and water recovery systems, as well as crew habitability criteria. The team also supported evaluation of other planned space station activities including medical, food systems and specialized shifts for monitoring consoles in the control room.

The four volunteers will tell JSC employees what it was like to live and work in the chamber at 3:30 p.m. Monday, March 31, in Teague Auditorium.

Bockting leaves legacy others aspire to obtain

[Editor's note: This is the third of four articles on the women of JSC for Women's History Month.]

By Jessie Hendrick

The Marilyn J. Bockting Award for Secretarial Excellence is given each month to the most outstanding secretary at JSC and is named in memory of a JSC employee who was well known around the center and in the Clear Lake Area.

Bockting held a variety of positions in her career, beginning as a clerk-typist in the Office of Naval Intelligence. She progressed to secretary then executive secretary while working for Army Intelligence at Douglas Aircraft Co. and Space and Electronics at Ford Motor Co.

In 1963, Bockting's boss, Jim Elms, was recruited by NASA to become the deputy director of the Manned Spacecraft Center in Houston. Bockting joined him at NASA as his administrative assistant. In 1973, she was selected as the assistant manager of the Program Administration Office, and in 1975, was promoted to manager, heading an organization that provided administrative services to all program office employees. While at JSC, Bockting presented secretarial training seminars to new clerical employees. In cooperation with the Civil Service Commission, she presented a 14-week training course on the behavioral aspects of secretarial practices.

As a part of the Clear Lake community, she helped to form the Spaceland Toastmasters Club, serving as its first educational vice-president and later as president. In 1979, she was elected lieutenant governor for the Eastern Division of District 56, Toastmaster International. Bockting was recognized nationally in 1975 when she was selected by the American Business Women's Association as one of its Top 10 women of the year. She also was the recipient of the coveted Abbey Award in 1983, which is given each year by the Clear Lake Chapter of ABWA.

Upon her retirement in 1980, Bockting started her own company, Career Resources, a service designed to assist women in finding suitable careers. In 1981, she relocated to California and lived there until her death in 1985.

The person who receives the Marilyn J. Bockting award exemplifies and displays willingness, dependability, dedication, motivation, flexibility and proficiency.

A few of the early recipients of the award are Carol Irby, Mary Nordin, Estella Hernandez Gillette, Teresa Sullivan and Paula Scheffman.

Deadlines change for Roundup submissions

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The Roundup also will provide more information about personnel, including new arrivals, moves and departures; safety activities and alerts; organizational accomplishments and adjustments; and community outreach activities and opportunities. Since the health and fitness of all employees are important to the center, new features also will include regular updates on Gilruth Center recreational opportunities, league sign-ups and standings.

With publication scheduled for every other Friday, deadlines will be Friday, three weeks before publication. Stories and ideas should be submitted to Managing Editor Karen Schmidt at Bldg. 2 Rm. 181 or e-mail at kschmidt@gp301.jsc.nasa.gov.

One big difference in the new Roundup will be the absence of the Swap Shop classified ad section. JSC's Human Resources Office will take on the responsibility of helping employees buy and sell personal items through bulletin boards in both cafeterias. These bulletin boards will allow employees to post their own notices. Detailed plans for how the bulletin board system will work are being developed.